

**EPO NO. 32-A
Retail CNG Dispensers****COMPRESSED NATURAL GAS (CNG) MOTOR FUEL DISPENSERS**

This Examination Procedures Outline (EPO) for CNG dispensers is divided into two (2) sections:

32-A. Basic Dispensers and 32-B. Remote Consoles (Key and Codelock, Card Reader Devices, and Receipt and Ticket Printers)

Almost all current CNG dispensers incorporate keylocks, card acceptors, and receipt/ticket printers in the main console. These are the dispensers discussed in EPO 32-A. You may, however, encounter some older models where the keylocks, card acceptors, and receipt/ticket printers are in separate or remote consoles. These remote devices have their own separate and distinct requirements for identification, indicating elements, and type approval and are discussed in EPO 32-B.

SAFETY NOTE – READ BEFORE CONTINUING

The inspector is reminded of the importance of evaluating potential safety hazards involved when working with flammable compressed gases

Make sure the test equipment is grounded and there is adequate ventilation around power operated equipment.

Determine pressure safety limit of test tank

Check station supply tank delivery pressure to determine if test tank will be suitable for testing. If allowed, a riser will be necessary when venting to atmosphere. Take extreme caution when venting.

Be aware of possible sources of ignition; otherwise, a compressor station with vapor recovery capability will be required.

Inspect equipment for leaks, exposed wiring, etc. If it appears unsafe, **DO NOT TEST!** Report conditions to operator and responsible authority (supervisor, fire marshal, EPA representative, etc.).

32-A. BASIC DISPENSERS**Introduction**

A CNG dispenser used to fuel vehicles shall indicate the quantity, unit price, and total price of each delivery. Does not apply to fleet and other contract sales. **S.1.2. [3.37.]**

During the inspection and test of the dispenser, the mass measured for each transaction shall be displayed continuously either externally, through an accessible internal display, or display the quantity in mass units by using controls on the device. **S.1.2. [3.37.]**

Pre-Test Inspection**1. Identification. S.5. [3.37.]; G.S.1., G-UR.2.1.1. [1.10]**

- 1.1. Pattern approval mark (i.e., type approval number).
- 1.2. Manufacturers or distributor's name or trademark.
- 1.3. Model designation or product name.
- 1.4. Non-repetitive serial number.
- 1.5. NTEP Certificate of Conformance (CC) number or a corresponding CC Addendum Number for devices that have a CC. [Non-retroactive as of January 1, 2003]

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- 1.6. Accuracy class for CNG motor fuel dispensers is 2.0. (Non-retroactive as of January 1, 1995.)
 - 1.7. Maximum and minimum flow rates in pounds per unit of time.
 - 1.8. Maximum working pressure.
 - 1.9. Applicable Range of Temperatures if other than -50°F to 120°F (-10°C to 50°C).
 - 1.10. Minimum Measured Quantity.
 - 1.11. Product Limitations, if applicable.
2. Type approval. **B&P Section 12500.5.**
3. Indicating elements.
- 3.1. Readability (must be clear and easily read). **G-S.5.1. [1.10]; S.1.1. [3.37.]**
 - 3.2. Return to zero (readily returnable to definite zero). **S.2.1.; U.R.3.7. [3.37.]**
 - 3.3. Unit price (must be displayed on each face of a computing or money operated device). **S.2.5.1. [3.37.]; S.1.2.; U.R.3.1. [3.37.]**
 - 3.4. Product identity (must be displayed on each side of the dispenser). **S.2.5.2. [3.37.]**
 - 3.5. The mass division shall not exceed 0.001 lb or 0.001 kg. The division for gasoline gallon equivalent (GGE) shall not exceed 0.001 GGE. The division for gasoline liter equivalent (GLE) shall not exceed 0.01 GLE. **S.1.3.3.(b) [3.37.]**
 - 3.6. Power loss Indications (quantity, unit price, or sales price, etc) shall be available for at least 15 minutes to complete any transaction. **S.2.4.1. [3.37.]**
 - 3.7. Selection of unit price shall be made prior to delivery. No change permitted during delivery. **S.2.5.3. [3.37.]**
 - 3.8. Dispenser shall have a non-resettable totalizer. NonRetroactive as of January 1, 1998 **S.7. [3.37.]**
4. Measuring element.
- 4.1. Directional flow valves shall be automatic in operation. **S.4.3. [3.37.]**
5. Discharge line.
- 5.1. Delivery hose with automatic vent back valve shall automatically pressurize before registration of a delivery. **S.3.7. [3.37.]**
 - 5.2. Measured vapor, with the exception of 5.3 below, shall not be diverted from a single discharge line during normal operation. **S.4.1. [3.37.]**
 - 5.3. Two (2) or more outlets may be operated provided measures are taken to prevent fraud. **S.4.1. [3.37.]**
6. Automatic density compensation. Automatic density correction required for mass flow metering systems and volume-measuring devices with automatic temperature compensation. **S.3.7.(a) and (b) [3.37.]**
7. Marking required. Either of the following statements to be permanently and conspicuously marked. "1 gasoline gallon equivalent (GGE) = 5.660 lb. of natural gas", or "1 gasoline liter equivalent (GLE) = 0.678 kg of natural gas". **S.5.1. [3.37.]**

Pre-Test Determinations

1. Determine availability of electric power if applicable for scale.
2. Inspect equipment for leaks, exposed wiring, etc. If it appears unsafe, **DO NOT TEST**. See important safety note on page one of this EPO (EPO No. 32-A-1).

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3. Scale used for testing.
 - 3.1. Ensure scale capacity is large enough to weigh test tank when it is full of product.
 - 3.2. The value of the scale division should not exceed 1/10 of the smallest tolerance applied to the device. **Section 2.3.1. SOP 8 NIST IR 6969.**
 - 3.3. Have sufficient test weights to verify scale's accuracy throughout its range. Use class "F" weights and apply error weight corrections.
 - 3.4. Supports, wedges or similar instruments to secure the receiving vessel on the scale platform.
 - 3.5. Ensure scale is level and free of obstruction prior to testing.
4. Test drafts.
 - 4.1. Normal Test. Tests made at the maximum discharge rate and at flow rates down to the rated minimum are normal tests. **N.6.1. [3.37.]**
 - 4.2. Repeatability Tests. Minimum of three consecutive tests drafts of approximately the same size. Ensure variations in temperature, pressure and flow rates are reduced to the extent they do not affect result. **N.6.1.1. [3.37.]**
 - 4.3. Special Test. Any test, except as set forth in N.6.1. Normal Tests, shall be considered a special test. **N.6.2. [3.37.]**
5. Tolerances.
 - 5.1. Normal and special tests. **Table T. 2. [3.37.]**
 - (a) Acceptance tolerance +/- 1.5%.
 - (b) Maintenance tolerance +/- 2.0%.
 - (c) Special tolerance +/-2.0%
 - 5.2. Repeatability. **T.3. [3.37.]**. Range of test results shall not exceed 40% of the absolute value of maintenance tolerance and each result shall be within applicable tolerance. **T.3. [3.37.]**

Normal Test

1. Computer jump tests. **[3.37.]**
 - 1.1. Remove nozzle from dispenser and connect to test cylinder. (Test cylinder pressure should not be greater than 200 psi to simulate an actual delivery.)
 - 1.2. Turn nozzle valve from "OFF" position to "FILL" position.
 - 1.3. Empty discharge hose.
 - 1.4. Turn nozzle valve to "OFF" position.
 - 1.5. Activate dispenser. Observe dispenser indications, if computer jump occurs, take appropriate action.
- NOTE:** A test cylinder is not necessary for the computer jump test on dispensers equipped with an autovent system. To test, turn dispenser on and observe the indication display for computer jump when the dispenser shuts off.
2. Test runs.
 - 2.1. Record the weight of the empty test tank.
 - 2.2. Connect nozzle to test tank. Open manual valve (if equipped).
 - 2.2.1. Turn dispenser on; observe if there is any computer "jump". If this condition exists, shut dispenser off. Take appropriate enforcement action. The dispenser shall automatically show its initial zero condition. **G-S.2. [1.10], U.R. 3.7. [3.37.]**
 - 2.2.2. For auto-vent hose type, hold nozzle in hand and turn on dispenser, observe if there is any computer "jump". Take appropriate enforcement

action. The dispenser shall show its initial zero condition. **G-S.2. [1.10], U.R. 3.7. [3.37.]**

- 2.3. Turn nozzle to "on" position and turn on dispenser. Dispense appropriate amount. **Observe pressure during delivery. If it exceeds the pressure safety limits of the test tank, manually shut off the dispenser and nozzle.**
 - 2.3.1. After delivery, turn nozzle to the "off" position.
- 2.4. Record the scale indication, dispenser indication, and print a receipt-
- 2.5. Check indications and computations on both sides of the dispenser for accuracy and agreement, if so equipped. **G-S.5.2. [1.10]**
- 2.6. Calculate the error of the dispenser. Determine the mass value of product in the test tank (weight of full tank minus weight of empty tank). Subtract this mass value of the product from the mass value indicated by the dispenser. Divide the difference by mass value of the product and multiply by 100. The result is the percent error of the dispenser.

Mass value of product = mass value of full test tank – mass value of empty tank.
 Dispenser Error = Mass Value indicated by Dispenser - Mass Value of Product /
 Mass Value of Product * 100

- 2.7. Conversion factors: **S.5.1. [3.37.]**
 - 1 Gasoline Gallon Equivalent (GGE) = 5.660 lb of natural gas
 - 1 Gasoline Liter Equivalent (GLE) = 0.678 kg of natural gas

To verify that the correct conversion factor has been programmed into the dispenser, divide the mass value indicated by the dispenser by the GGE or GLE conversion factor. The calculated value must agree with the volume indicated by the dispenser. Volume calculations that have more places to the right of the decimal point than the dispenser display must be rounded to the nearest dispenser indication (if that number is 5 followed by zeros, then the dispenser volume is allowed to round up or down).

Example: Indicated Volume = 1.828 gal
 Indicated Mass = 10.344 lb
 Calculated Volume = 10.344 lb ÷ 5.660 lb/gal = 1.827561837 gal (rounded to 1.828 gal)

- 2.8. Apply applicable tolerance. **Table T.2. [3.37.]**
- 2.9. Return of product to storage. **UR.3.8. [3.37.]**

IMPORTANT! Provisions at the site shall be made for returning product to storage or disposing of the product in a safe and timely manner during or following testing operations. Such provisions may include return lines, or cylinders adequate in size and number to permit this procedure. **UR.3.8. [3.37.]**

3. Zero-Set-Back Interlock Test.

- 3.1. Remove nozzle from hanging position
- 3.2. Reset computer to zero and turn dispenser "on."
- 3.3. Attempt to return the nozzle to its designated hanging position without engaging interlock or turning off the dispenser. **S.3.8.(b) [3.37.]**
- 3.4. After placing nozzle in its designated hanging position, carefully remove it again and connect nozzle to the test tank and open the test tank valve. Attempt to dispense product by turning nozzle to the test tank and open the test tank valve. Attempt to dispense product by turning the nozzle toward the "on" position. **S.3.8.(a) [3.37.]**
- 3.5. If product flows without resetting the indications to zero, the interlock assembly is not functioning properly.

4. Provision for sealing electronic adjustable components. If the device is designed for a Category I or II sealing method, make sure you seal that portion of the device. You will have to remove the sides of the dispenser to get access. **S.3.5.; Table S.3.5. [3.37]**

EPO NO. 32-B
Retail CNG Remote Consoles

COMPRESSED NATURAL GAS (CNG) REMOTE CONSOLES

32-B. KEY/CODELOCK, CARD ACCEPTOR DEVICES, RECEIPT/TICKET PRINTERS

Some older CNG dispensers do not incorporate keylocks, card acceptors, and receipt/ticket printers in the main console but are contained in separate or remote consoles. These remote devices have their own separate and distinct requirements for identification, indicating elements, and type approval. If the keylocks, card acceptors, and receipt/ticket printers are contained in the main console, use EPO 32-A.

Pre-Test Inspection

1. Identification. **G-S.1 [1.10]**
 - 1.1. The name, initials, or trademark of the manufacturer or distributor.
 - 1.2. Model number (on identification plate attached to an exterior surface of the console/printer).
 - 1.3. Non-repetitive serial number.
 - 1.4. Software Version number if appropriate.
 - 1.5. NTEP -- CC number [Non-retroactive as of January 1, 2003]
2. Type approval. **B&P Section 12500.5.**
3. Indicating elements.
 - 3.1. Readability (must be clear and easily read). **G-S.5.1 [1.10]**
 - 3.2. Return to zero (readily returnable to definite zero). **S.2.1 [3.37.]**
4. Digital indications.
 - 4.1. All digital indications shall agree. **G-S.5.2.2(a) [1.10]**
 - 4.2. All mathematical computations shall agree.

Tests

1. Remote system.
 - 1.1. Dispense product as outlined in the "Basic Dispenser" test.
 - 1.2. Compare all indications and tickets for digital and mathematical agreement. **G-S.5 [1.10]**
2. Receipt/ticket printer. (Computing type only)
 - 2.1. Printed receipt/ticket must have the unit price, quantity delivered, total price, and product identity. **S.2.7. [3.37.]; G-S.5.5 [1.10]; G-S.5.6 [1.10]**
 - 2.2. Printed total quantity must agree with the indicated quantity. **S.6.(b)(e)[3.37.]**
 - 2.3. All digital representations of like values must agree. **G-S.5.2.2 [1.10]**
 - 2.4. Printed quantity delivered must be to at least three decimal places for the gasoline gallon equivalent (GGE) and to at least two decimal places for the gasoline liter equivalent (GLE) (e.g., 15.125 GGE, 57.25 GLE). **S.1.3.3(b); S.6.(b)(e); [3.37.]**